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SPECIALIZED MOBILE RADIO

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Preface

In the past few years, interest has grown in Specialized Mobile Radio (SMR), a commercial private radio communications service. This background paper has been prepared to provide information on this industry.

We would like to thank the many people in the SMR industry who have kindly given us their valuable time and shared their knowledge so that we might produce a more interesting and informative document.

This paper is a minor revision of the original February 1991 version. The only change is the addition in the history appendix of a summary of the Fleet Call waiver.

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SPECIALIZED MOBILE RADIO

Abstract

In 1974, the Federal Communications Commission created the Specialized Mobile Radio (SMR) Service. This service, little known to the general public, has rapidly developed into one of the most exciting industries regulated by the Commission. SMR service is available in more of the country than better known services such as cellular radio and cable TV. This service has been copied in many European countries, Canada and Japan. SMR systems today provide service in the U.S. to over one million radio users. By the twenty-first century, SMRs will be a multibillion dollar industry providing critical communications support to several million American workers. This paper provides a detailed description of what an SMR is, a basic analysis of the regulations faced by SMRs and an economic summary of the SMR industry. The paper concludes with a detailed history of Commission regulations regarding SMRs.

I. What is an SMR?

In 1934, Congress created the Federal Communications Commission and charged it with responsibility for allocating and regulating the nation's radio spectrum. Much of the Commission's initial work involved allocating specific segments of the spectrum to specific classes of users. The Commission has allocated spectrum to broad categories of users such as broadcasters, which include AM, FM, and television stations, and common carriers, such as long distance phone companies and cellular radio operators. A third category, consisting of businesses and other entities using spectrum for private communications purposes, has become known as the private radio services.

In the private radio services, the Commission historically set aside certain spectrum for use by particular industries. This resulted in various radio services associated with specific industries such as the Motion Picture Radio Service, the Forestry-Conservation Radio Service, and the Taxicab Radio Service.¹ As demand for service has grown, the Commission has begun promoting more efficient use of the spectrum by allowing marketplace forces to play a greater role in the day-to-day management of private radio services.² A major example of this new policy was the Commission's creation

1 See Part 90 of volume 47 of the Code of Federal Regulations for definitions of these groups and for a complete list of radio service groups.

2 In addition, the Commission was interested in promoting a new, spectrum efficient technology, trunking, which was too expensive and complicated for many businesses to build and operate themselves.

in 1974 of a new radio service, Specialized Mobile Radio (SMR), to provide land mobile communications on a commercial (i.e., for profit) basis to those users who could themselves have been licensed in the private land mobile services. Today, this approach has made two-way mobile communications available to many businesses, governmental units and individuals who otherwise might have gone unserved.

The first SMRs began operating a little more than a decade ago.³ In 1987, private sources estimated annual sales of SMR operating systems, end-user equipment, attendant services, and miscellaneous products and services at \$1 billion.⁴ Currently there are about 7000 SMR systems nationwide.⁵ We estimate there are over one million mobile and fixed radio units using SMRs.

In simple terms, an SMR operator owns a radio system that includes one or more base station transmitters, one or more antennas, and other radio equipment that third parties may, for a fee, use. The third party usually, but not always, provides his own mobile radio unit. This fee, plus a license

3 According to a study of our records, the oldest existing SMR was licensed in August 1977 in Chicago. The next SMR, however, was not licensed until late December 1978.

4 See J.P. Harris, "SMR: A Billion Dollar Industry," Communications, December 1987, 76-79.

5 There are about 1300 800 MHz conventional SMR systems (almost all with only one channel each), about 5100 800 MHz trunked SMR systems (with a total of about 32,500 channels) and about 575 900 MHz trunked SMR systems (almost all with ten channels each).

from the Commission, entitles an end user to send and receive radio messages through the SMR system or to make and receive mobile telephone calls.⁶

The main service provided by an SMR is that the radio system receives either telephone transmissions or low power signals from end user mobile radios or from telephone transmissions. Those messages are then either retransmitted with a much stronger radio signal so that other radios can hear the original message or routed through phone lines.⁷ Without this type of repeater process, the electromagnetic frequencies used by SMR systems would not be practical for mobile communications.

SMR systems consist of two types: conventional and trunked radio systems. Trunked systems, which constitute the majority of SMR systems, are much more efficient in terms of the number of users that can be supported. With conventional systems, an end user will typically be licensed for only one

6 The definition of an SMR as stated in Part 90 of the Commission's Rules and Regulations follows:

Specialized Mobile Radio Service. A radio service in which licensees provide land mobile communications services in the 800 MHz and 900 MHz bands on a commercial basis to entities eligible to be licensed under this part, federal government entities, and individuals.

7 A control station located at the end user's office can use phone lines to communicate to mobiles via the SMR system, and thereby initiate calls to a mobile radio using phone lines. In fact, in most SMR systems, anyone can initiate a call using any telephone. The control station is highlighted mainly because it is typically the primary source of fixed to mobile communications, and because it may use the SMR frequencies rather than the telephone network to initiate and carry out the call.

channel (frequency).⁸ If someone else is already using that end user's assigned channel, the end user must wait until that channel is available, even if a channel on another system in the same market is currently unused. With a multi-channel trunked system, the system's microprocessing capabilities automatically search for an open channel.⁹ This "search" capability allows more users to be served per radio channel. This efficiency arises because the probability of all channels in a large system being used at one time is lower than the probability of a single given channel being used. Once a user is assigned a channel by the system, no one else can use that channel and interfere with the end user's communications for the duration of that communication.

⁸ The terms "channel" and "frequency" are generally used interchangeably. A channel is a band of frequencies, 25 or 12.5 kHz wide for SMRs, that is used for transmission (this is a simplification in that a transmission does not sharply cut off at a specific frequency). A frequency generally refers to the midpoint of a channel.

An SMR operation actually operates on paired channels. One channel of a pair is used for transmission by mobile radios and the other is used to retransmit (repeat) the low power mobile signal received by a mobile with a stronger signal that can be received by other mobiles. This retransmission is necessary in the frequency range used by SMRs if mobile radios are to have a reasonable geographic range of operations. Because channels are paired by the Commission, it is assumed that when the term channel is used, the other half of the pair is included unless context indicates otherwise.

⁹ Some systems use a device called a controller, which is essentially a computer, to assign channels to end users. This piece of equipment is expensive and is, therefore, sometimes shared by two or more systems located at the same site. Other systems have the function of the controller distributed among other equipment such as the repeaters or mobiles.

Trunked systems also have privacy benefits: because a user could be talking on any of the channels within the trunked system, unauthorized parties have a more difficult time eavesdropping on the communications of a specific trunked SMR system user than on those of a traditional one channel conventional SMR system user. This increased privacy is one of the key selling points of trunked systems. Because of the relatively high cost of building a trunked system and the general unavailability of private radio spectrum in major urban markets, few businesses could afford, or acquire sufficient spectrum for, trunked radio systems without SMRs.

SMR end users typically operate in either a "dispatch" mode or an "interconnected" mode. Many SMRs have the flexibility to offer both modes.¹⁰ Dispatch mode is two-way, over the air, voice communications between two or more mobile units (e.g., between a car and a truck) or between mobile unit(s) and fixed units (e.g., between the end user's office and a truck). Dispatch communications are generally short, under one minute. A well known example of dispatch communications by non-SMRs is a police dispatcher who radios a message to all patrol cars (or a specific police unit) to go to the scene of a crime. The return call by a given patrol car is also a dispatch communication. Typical SMR customers using dispatch communications include

¹⁰ A review of our licensing records indicates that over 40% of the 900 MHz SMR systems and over 50% of trunked 800 MHz SMRs are licensed for interconnection. All SMRs are licensed to operate in the dispatch mode.

construction companies with several trucks at different jobs or on the road, with a dispatch operation in a central office.

Interconnected mode is interconnection of mobile radio units with the public switched telephone network. This lets the mobile radio unit function as a mobile telephone. It is in this area that SMR service is similar to cellular telephone service.

The following example illustrates the operation a typical SMR service.

John's Limo Service has several cars that John needs to communicate with from his office (i.e., dispatch service). He decides to obtain this dispatch service, along with the necessary radio equipment, from ABC SMR Systems. Now, if a customer phones John's Limo Service and asks John to send a limo, John transmits a radio message to ABC's SMR station, which automatically repeats the message for pickup by any or all of John's limousines. If a driver wants to respond to the call, he may then send a return message to John via the same station. In fact, any of the cars may hold a conversation with any other car or with John back at the office. For a fee that includes the cost of telephone service, ABC SMR Systems will interconnect any of John's drivers with the local phone system. Thus, if the limo driver could not find the client's house, he could call the client for better directions. (See Figure 1).

ABC SMR Systems' microprocessing capacity can be used for several purposes besides assigning users open channels. For example, ABC can use the

microprocessors controlling the trunking process to monitor a given end user or to measure use for billing purposes if billing is on the basis of air time used. In addition, the microprocessors can be programmed to provide a wide array of services. For example, John can simultaneously speak to all the limos or speak only to a specific limo. Specific radios in the fleet can be given greater degrees of privacy. John can restrict car-to-car conversations to prevent the drivers from wasting time by talking to each other. The microprocessors can restrict phone calls to local service only.

Many mobile radios are capable of using several different SMR systems. This feature allows operators of several SMR systems to offer wide area or roaming service to end users. One of the more common advanced features offered by SMR operators is Direct Inward Dialing. This feature allows anyone to easily initiate direct telephone contact with individual cars. With this option, an individual limo can be telephoned with no more steps or digits than a standard phone.

The SMR industry offers relatively low cost and reasonable quality mobile communications to end users. SMRs generally offer business a less expensive alternative to cellular service, while offering services not readily available elsewhere. Because large numbers of end users can share a system, SMRs make trunked technology accessible to smaller businesses that could not afford trunked technology on an individual basis. Thus small businesses can obtain mobile communications of a quality comparable to that available to much bigger businesses. SMRs also make a broad range of service (such as direct dialing

to specific cars or sets of cars) and different billing options (such as flat rates vs. airtime billing) available to businesses of any size.

Free market competition also has contributed to the success of the SMR industry. SMRs are not subject to state regulation and have been subject to increasingly flexible federal regulations (as set by the Commission). While consolidation has reduced the number of competitors in each market, the industry continues to be competitive.¹¹ In sum, the SMR service has become successful because of good service, privacy, flexibility, competition, and reasonable prices.

The next chapter includes a summary of the Commission's rules. An appendix after the main section chronologically summarizes the documents cited in this next chapter. The appendix is a history of the Commission's regulations governing SMRs. Following the next chapter is a summary of the SMR industry today.

¹¹ Competition includes not only intra-industry competition, but also competition within the the broader mobile radio industry.

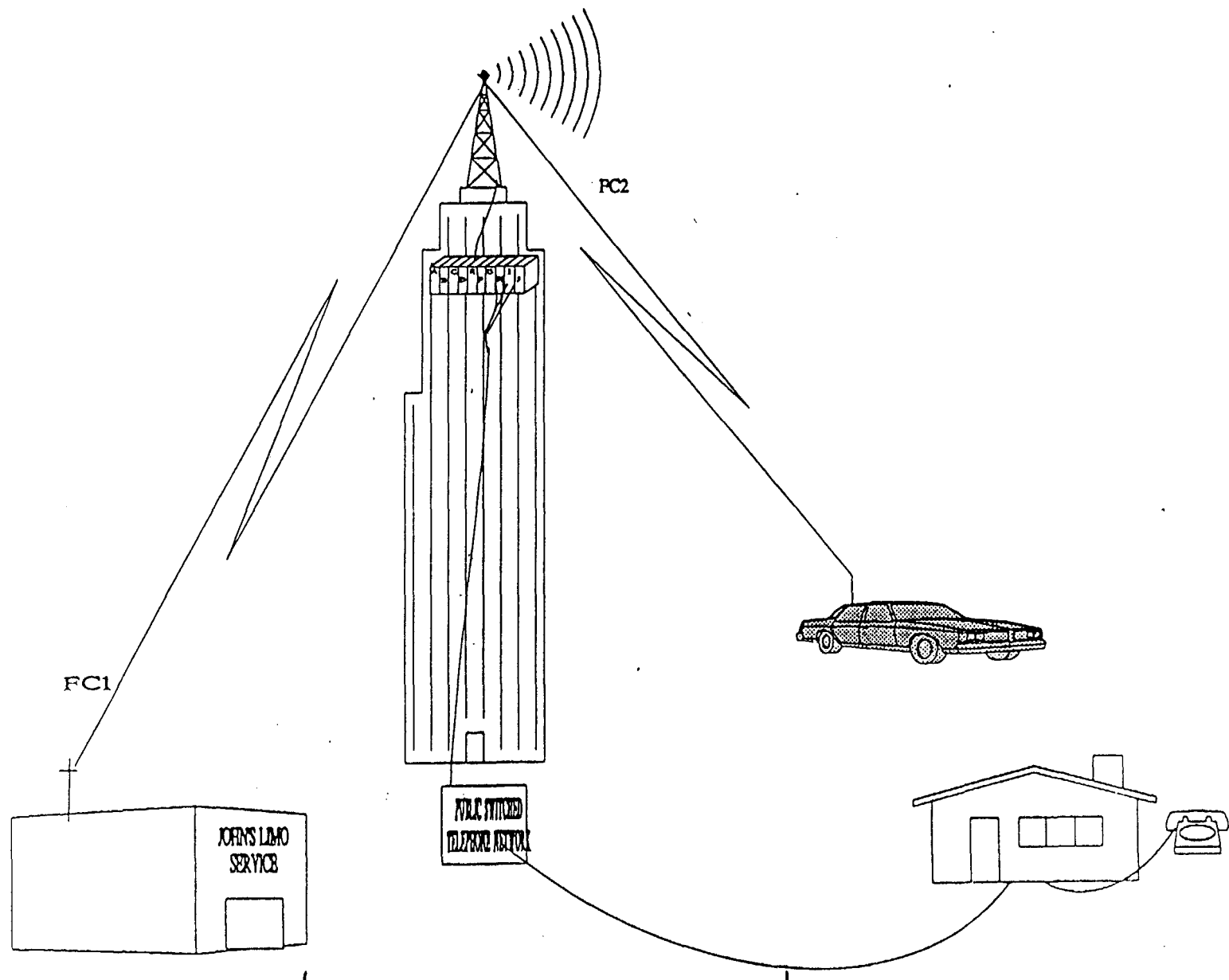


FIGURE 1

10 CHANNEL TRUNKED SMR OPERATION WITH 4 INTERCONNECTED CHANNELS.

The SMR operation will be located at a point above the local terrain, such as a tall building. When John picks up his radio, the SMR equipment assigns him a pair of open channels, in this case FC. John's message is broadcast over FC1, received by the SMR repeater and retransmitted on FC2 to the limo. If a passenger in the limo wants to place a phone call, he/she will be assigned an interconnected channel. The call will then be routed at the SMR to the local public switched telephone network.

II. Regulations

SMRs operate under a different set of regulations than other commercial radio services such as Radio Common Carriers and Cellular Radio operators. Over the past few years, these regulations have become extremely flexible.¹²

The most basic rule is that SMRs are considered private carriers. By virtue of being private, rather than common, carriers SMRs are exempted by Section 331 of the Communications Act from state entry or rate regulation.¹³ Nor does the Commission regulate the prices charged by private carriers. The absence of state and price regulation is considered by many to be critical to the industry's ability to achieve maximum growth and efficiency.

The first regulatory hurdle in getting an SMR license is finding available frequencies at a desirable site. Two distinct sets of frequencies are available for SMR operation: 800 MHz and 900 MHz.¹⁴ The radio equipment

¹² For a complete review of the regulations SMR systems are currently subject to see Part 90 of Volume 47 of the Code of Federal Regulations, particularly Subpart S.

¹³ Many of the original FCC restrictions on interconnection of SMRs to the public telephone network were designed specifically to insure the private carrier status of SMRs. Since the Communications Amendments Act of 1982 was signed into law on September 13, 1982, specialized mobile radio has been explicitly defined as a private land mobile service and, therefore, not subject to any rate or entry regulation by state or local governments. The statute also permits interconnection with the public switched telephone network on a non-profit basis. This has allowed the Commission to relax its restrictions on interconnection. See the Communications Amendments Act of 1982, P.L. 97-259, 96 STAT 1087, September 13, 1982; Section 331 of the Communications Act of 1934, as amended, is codified at 47 U.S.C. § 332.

¹⁴ In fact, 800 MHz must be subdivided further into at least two parts.

intended for 800 MHz SMRs is not currently compatible with radio equipment intended for 900 MHz SMRs (and vice versa).¹⁵

The Commission is currently accepting applications only for 800 MHz frequencies because all the 900 MHz channels currently available for SMR systems (which are in the 50 largest urban markets) either have already been assigned or will be assigned based upon lotteries that have already been held.¹⁶ In 1989, the Commission released a **Notice of Proposed Rule Making**

When the Commission originally created the SMR service, separate frequencies were made available for private land mobile service based on technology (200 channel pairs for trunked technology and 100 channel pairs for conventional technology). Those frequencies for trunked technology have since been designated specifically for SMRs, and are sometimes referred to as the "old" frequencies. See Second Report and Order, Docket No. 18262, 46 FCC 2d 752 (1974), recon., Memorandum Opinion and Order, Docket No. 18262, 51 FCC 2d 945 (1975), and Report and Order, PR Docket No. 86-404, 3 FCC Rcd. 1838 (1988). In 1982 an additional 80 channels were made available to SMRs. See Second Report and Order, PR Docket 79-191, 90 FCC 2d 1281 (1982). These are sometimes referred to as the new frequencies. Channels designated for use by other services (other than public safety) are also available to SMRs through intercategory sharing provided no frequencies are available from those designated for SMRs. See Report and Order, PR Docket No. 86-404, supra.

¹⁵ A major reason for this incompatibility is that the channel bandwidths for 900 MHz systems are half the bandwidths for 800 MHz systems (12.5 kHz vs 25 kHz). Another reason is that the separation between the transmit and receive channels of a given channel pair is 45 MHz for 800 MHz systems and 39 MHz for 900 MHz systems. A more serious incompatibility is the fact that the frequencies available for 800 MHz SMR systems and 900 MHz SMR systems are sufficiently far apart as to require separate antennas and other equipment for both the SMR base stations and the end user's mobile radios. See Second Report and Order, Docket No. 18262 supra.; recon., Memorandum Opinion and Order, Docket No. 18262, supra. at footnote 14; and Report and Order, Gen. Docket No. 84-1233, 2 FCC Rcd. 1825 (1986).

¹⁶ See Public Notice, Private Land Mobile Application Procedures for Spectrum in the 896-901 MHz and 935-940 MHz Bands, 1 FCC Rcd 543 (1986)(Public Notice of November 4, 1986).

concerning the allocation of 900 MHz channels outside these 50 markets.¹⁷ The Commission has proposed that some channels be made available for national SMR licenses. The Notice proposes modification of the "40 mile rule" (discussed below) to make it easier for SMR operators to develop regional systems. The Notice also discusses reassignment of channels taken back in the original 50 markets due to non-construction or other reasons.

In searching for available 800 MHz frequencies, the most important rule to consider is the 70 mile co-channel separation rule. Each SMR system operating on particular frequencies is granted a 70 mile¹⁸ separation between its primary site¹⁹ and the primary site of any other system operating on the same

¹⁷ See Notice of Proposed Rule Making, PR Docket No. 89-553, 5 FCC Rcd. 705 (1990).

¹⁸ Co-channel separation is 105 miles in parts of California and Washington State. See 47 C.F.R. § 90.621(b) for exact areas.

¹⁹ When you apply for a license, you must specify a primary site. At that site, you must construct and operate an SMR system using every frequency for which you are licensed. You may also have secondary sites. (Our records show over 350 secondary sites for trunked 800 MHz SMRs.) Secondary sites need not use every frequency. They are not accorded any protection from interference. On the other hand, transmissions from these sites may not create interference with any transmission from any other system's primary site.

frequencies.²⁰ An available frequency, therefore, is a frequency for which there are no other licensed systems within 70 miles of the proposed site.

If you wish to try to obtain 800 MHz frequencies at a site with no available frequencies, you may have your name put on a waiting list. Currently there are waiting lists for 35 areas (mostly major metropolitan areas plus the State of Florida). (See Table 1 for a list of these cities.)²¹

Another way to get into the SMR business is to purchase an existing system. If you do purchase an existing system and own other SMR systems, you are subject to a rule specifying that if you own two 800 MHz trunked

20 A waiver of this rule will be granted if all affected parties agree. See Public Notice, Clarification and Simplification of Procedures for 800 MHz Systems in the Private Land Mobile Services, Mimeo No. 160 (October 14, 1986). A study of our records indicates over 75 so-called short-spacing agreements involving about 130 SMR systems. The Commission has proposed eliminating the waiver requirement provided a short-spacing agreement exists. The Commission also proposed eliminating the waiver requirement for use of technical showings as grounds for short-spaced assignments in the absence of short-spacing agreements. See Notice of Proposed Rule Making, PR Docket No. 90-34, 55 Fed. Reg. 8966 (March 9, 1990) and Further Notice of Proposed Rule Making, PR Docket No. 90-34, FCC No. 91-40, adopted February 5, 1991.

21 A preference is granted on these waiting lists to fully loaded existing systems seeking additional channels (noted as "modifications" on the waiting lists). As frequencies become available, they are assigned on a first-come, first-served basis to systems with preferences. If no applicant has received a preference, then assignment is strictly first-come, first-served. See Second Report and Order, Docket No. 18262, supra.; recon., Memorandum Opinion and Order Docket 18262, supra.; and Report and Order PR Docket No. 86-404, supra note 14.

systems or two 900 trunked MHz systems within 40 miles of each other,²² at least one system must have at least 70 mobile radios per channel loaded on it.²³ Like many of the rules that will be described below, this rule was instituted to prevent spectrum hoarding.²⁴

An additional rule to consider is that the Commission will not permit the transfer of an SMR license to another person, corporation or other entity, unless the licensed system is constructed and operational. This rule helps to deter the filing of applications by persons who do not intend to provide service to the public.

Once you have obtained a channel or channels, your next step will be to construct your SMR system. Our rules allow one year to construct your trunked system and place it in operation.²⁵ This rule, like others discussed before, is intended to reduce spectrum hoarding. In constructing your system, you must decide whether to offer interconnection with the public telephone network

22 Mileage is measured between primary base stations.

23 See 47 C.F.R. § 90.627(b). As mentioned before, the Commission is proposing to modify this rule. See Notice of Proposed Rule Making, PR Docket No. 89-553, supra note 17.

24 Since the intent of this rule was to prevent people from owning more than one unloaded system per market, this rule will be waived if the applicant demonstrates that the two unloaded systems serve different markets. A review of our records indicates that at least 50 such waivers have been granted involving over 100 trunked 800 MHz systems.

25 See 47 C.F.R. § 90.631(f). There are some technical rules involving the design of your system. See 47 C.F.R. §§ 90.635 - 90.647. Equipment vendors are a good source of practical advice on how these regulations affect you.

to your customers. Our rules allow you great flexibility in offering interconnection. You may not, however, resell the actual telephone service for profit.²⁶ The specific requirement is that all telephone service costs incurred by the SMR operator should be passed through to the end user without a mark-up or additional charges. Our rules are also extremely flexible in terms of the technology you may use. There are no interoperability standards, either analog or digital transmissions are permissible and, subject to interference criteria, non-standard bandwidths are permitted.²⁷ Fixed use is permitted on a secondary basis.

You may, if you wish, have your system managed by a third party. Third party SMR managers typically are also SMR operators. The Commission allows you to use a system manager, provided you retain supervisory control over the system.²⁸

Once you begin marketing your services, you will have to ensure the licensing of your customers (end users). Each end user must have a license to operate mobile radios. End users may, however, use your system under a

²⁶ See Report and Order, Docket 20846, 89 FCC Rcd. 2d 741; and the Communications Act, 47 U.S.C. § 332(c)(1).

²⁷ See Second Report and Order, PR Docket No. 79-191, supra; and Report and Order, PR Docket No. 86-404, supra.

²⁸ You must also maintain a bona fide proprietary interest in your system. For details, see FCC News Release No. 6440 (August 15, 1985).

temporary permit for up to 180 days provided they have applied for a license.²⁹

Another major requirement is loading, which refers to the number of mobile stations served by your system. For purposes of the loading requirements, mobiles include mobile radios in cars and trucks, portable radios and control stations (such as the fixed unit at an end user's office). You must have loaded your system with at least 70 mobiles per channel to avoid having channels taken back when you renew your license after the initial five-year licensing term.³⁰ This rule only applies to systems located at a site for which all the channels have been assigned (i.e., to systems located in wait list areas). This rule will be phased out. Systems licensed after June 1, 1993, will not be subject to loading standards for purpose of channel take backs. For purposes of obtaining additional channels, loading will continue to be required.³¹

Loading requirements are and will continue to be important for two other reasons. The first reason is the 40 mile rule previously discussed. The second reason is that except in rural areas,³² you may not add additional

29 See 47 C.F.R. §§ 90.655 and 90.657.

30 See 47 C.F.R. § 90.631(b).

31 See Report and Order, PR Docket No. 86-404, supra.

32 See 47 C.F.R. § 90.631(d) for the definition of a rural area for the purposes of adding channels. A rural system licensee may apply for up to five more channels than it has constructed. If a wait list does become necessary in the future in a particular rural area, all systems licensed before June 1,

channels to your system unless you have loaded an average of at least 70 mobiles per channel. This rule also is designed to prevent spectrum hoarding.

1993 and not loaded to 70 mobiles per channel within one year of the establishment of the wait list will be subject to channel takebacks.

Table 1

Private Radio 800 MHz Radio Systems Application Waiting List
Based on Public Notice dated July 2, 1990

| City | No. App. on List | Date of App. on Top of List | Date of App. on List Longest |
|-------------------------------|---------------------|--------------------------------|---------------------------------|
| Atlanta, GA | 59 | 1/19/88 | 6/25/85 |
| Austin, TX | 18 | 3/20/90 | 9/18/86 |
| Boston, MA | 92 | 3/31/87 | 9/06/83 |
| Buffalo, NY | 17 | 4/14/88 | 4/14/88 |
| Charlotte, NC | 18 | 4/18/90 | 7/28/89 |
| Chicago, IL | 56 | 11/05/84 | 5/20/81 |
| Cleveland, OH | 27 | 4/11/89 | 4/14/88 |
| Dallas/Fort Worth, TX | 51 | 11/20/85 | 4/21/82 |
| Denver, CO | 28 | 8/31/89 | 12/31/84 |
| Detroit, MI | 37 | 4/14/88 | 4/14/88 |
| El Paso, TX | 13 | 12/17/88 | 5/13/88 |
| Florida (6 sites) | 320 | 9/12/85 | 9/28/83 |
| Harlingen, TX | 10 | 10/22/88 | 10/22/88 |
| Houston, TX | 47 | 12/27/85 | 10/24/80 |
| Las Vegas, NV | 31 | 12/11/89 | 10/19/88 |
| Los Angeles, CA | 114 | 2/14/84 | 7/19/79 |
| Miami, FL | 93 | 9/12/85 | 9/28/83 |
| Midland, TX | 11 | 8/06/89 | 8/06/89 |
| Milwaukee, WI | 7 | 4/11/90 | 6/07/88 |
| Minneapolis, MN | 20 | 5/11/90 | 7/12/88 |
| New Orleans, LA | 32 | 6/21/89 | 3/30/87 |
| New York, NY | 97 | 6/21/83 | 12/23/81 |
| Northern California (4 Sites) | 171 | 10/29/84 | 11/21/80 |
| Philadelphia, PA | 82 | 2/17/87 | 2/22/84 |
| Phoenix, AZ | 33 | 5/21/84 | 5/21/84 |
| Portland, OR | 15 | 1/11/90 | 8/11/89 |

| | | | |
|------------------|----|----------|----------|
| Raleigh, NC | 10 | 10/25/89 | 10/25/89 |
| Rochester, NY | 20 | 4/14/88 | 4/14/88 |
| Saint Louis, MO | 14 | 11/15/89 | 6/16/88 |
| San Antonio, TX | 16 | 3/05/90 | 6/02/86 |
| San Diego, CA | 25 | 4/14/88 | 4/14/88 |
| Seattle, WA | 20 | 11/03/88 | 4/20/88 |
| Tucson, AZ | 13 | 5/25/88 | 5/25/88 |
| Washington, D.C. | 91 | 12/05/85 | 12/21/82 |
| Yuma, AZ | 7 | 7/28/89 | 7/28/89 |

| | | | |
|-------|------|--|--|
| Total | 1811 | | |
|-------|------|--|--|

Note: A waiting list area is generally defined by a 100 mile radius about a set of coordinates given for the city. Northern California is defined by 4 such coordinates. Florida is defined by 6 such coordinates. Some applicants appear on waiting lists for two cities located less than 70 miles apart. Any such applicant receiving channels in one of the cities would be removed from the waiting list for the other city. All wait-listed applications are for trunked SMRs. In addition, there are applicants for conventional SMRs in Los Angeles(1), Cleveland(3), Detroit(2), San Diego(1), Seattle(7) and Tucson(1), and an applicant for trunked Public Safety/Special Emergency Service in New York. Licensees with fully loaded trunked systems are given a preference over other applicants.

III. A Summary of the SMR Industry Today³³

As of February 6, 1991, the Commission's database included 5,093 licenses issued nationwide to SMR trunked system operators on about 32,750 channels in the 800 MHz band. This works out to an average of 6 channels per system. There were about 5460 SMR base stations at about 3800 individual sites. The 370 additional stations above the number of licensees are secondary sites. One reason for fewer SMR base station sites than licenses is that two or more licensees with fewer than 20 channels each in a given city may share equipment and workforce to lower costs. In particular, they may share a controller. In addition, the limited number of preferred sites in major metropolitan areas also reduces the number of sites. A review in November 1988 of 371 call signs located near 10 major metropolitan areas shows an average of 7.74 channel pairs per call sign as opposed to the current nationwide average of 6 channel pairs per call sign. This indicates that SMR systems located in urban markets have more channels on average than SMR systems located in rural markets. For a state-by-state summary of trunked 800 MHz systems, see Table 2 below. The top 10 urban markets by loading are listed in Table 3 below.

33 Some of this data, particularly information on prices, is based on discussions with Russell Fox of the American SMR Network Association, Inc., Brad Busse of Daniels & Associates, Lee Dixon of Dixon Communications Associates, Rick Frisbie of Battery Ventures, Lana M. Ritzel of Ritzel Communications, Dale Hatfield of Hatfield Associates, and Meade Sutterfield of Johnson Communications.

Additional numbers are based on a study of SMR loading records as of the end of March 1989, several studies of the Commission's database and ongoing statistical reports by the Licensing Division.

There were also 1,302 licenses for 800 MHz conventional SMR systems and 680 licenses for 10 channel 900 MHz SMR systems. The nationwide allocation of 900 MHz channels will result in over 15,000 licensed channels by 900 MHz SMRs. By sometime in the 1990's, we expect over 7,000 800 MHz and 900 MHz SMRs using over 50,000 channels.

One of the most interesting trends in the SMR industry has been the movement towards regional and even national systems. The Commission has approved waivers requested by RAM Mobile Data Communications for a 900 MHz national mobile data system and by Millicom for a 900 MHz nationwide voice and data system. Motorola Inc. is implementing a national 800 MHz SMR system called Coverage Plus that will eventually provide seamless coverage from coast to coast. The Commission has also granted waiver relief to Fleet Call for several multi-site regional systems that will use digital multiple access techniques. The trend toward development of regional systems has led to a significant increase in the number of rural SMRs. In response, the Commission adopted a Notice of Proposed Rule Making (900 MHz Phase II) on November 28, 1989, that would provide for nationwide 900 MHz licenses and facilitate the development of regional systems.³⁴

³⁴ See Notice of Proposed Rule Making, PR Docket No. 89-553, supra note 17. A second Notice of Proposed Rule Making, (PR Docket No. 89-552, 55 Fed. Reg. 328 (1990)), also adopted on November 28, 1989, would provide for trunked commercial national licenses in the 220 - 222 MHz band similar to SMRs.